



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,830	12/21/2000	Il Ryong Park	2658-0250P	6588

2292 7590 10/23/2003

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER

CROWELL, ANNA M

ART UNIT	PAPER NUMBER
----------	--------------

1763

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/740,830

Applicant(s)

PARK, IL RYONG

Examiner

Michelle Crowell

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1,3-10 and 12-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-10 and 12-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-9, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (Japanese Patent Publication 09-106978) in view of Takeda et al. (Japanese Patent Publication 10-189532).

Referring to Drawing 1 and paragraphs [0014-[0019], Miyazaki discloses integrated processing apparatus comprising an etch chamber 4 (etching line), stripper 8 (stripping line) and rinse room 11 (cleaning line) on the stripping line.

As seen in Drawing 1 and abstract, an elevator is used to move the wafers from the stripper 8 to the rinse room 11. More specifically, the elevator conveys the wafer from stripper 8 to the storage room 6, to the wafer transfer machine 10, and then to the rinse room 11.

Regarding claims 3 and 9, wafer transfer equipment 5 (transfer module) moves the wafers from the etch chamber 4 to the stripper 8.

Art Unit: 1763

Regarding claims 4, 5, 8, and 12-14, a load lock chamber 3 (loader) feeds the wafers into the etch chamber 4 (paragraph [0014]). Wafers are sent from the etch chamber to the rinse room 11. After the cleaning process, the wafers are sent to the unloader (paragraph [0019]). Both the loader and the unloader use a conveyor to transfer the wafers (paragraph [0019]).

Miyazaki fails to teach rinsing a substrate after etching and prior to stripping.

Referring to the abstract and Drawing 1, Takeda et al. teaches an etch/strip apparatus including an etch module 2 and a rinse module 4 for etching and rinsing a substrate prior to stripping. By rinsing the substrate after etching, the etchant and etchant residues are washed from the substrate prior to the stripping process. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a rinse module after etching and prior to stripping in order to wash etchant and etchant residues from the substrate prior to the stripping process.

3. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (Japanese Patent Publication 09-106978) in view of Takeda et al. (Japanese Patent Publication 10-189532) as applied to claims 1, 3-9, and 12-14 above, and further in view of Iwai et al. (Japanese Patent Publication 06-224145).

The teachings of Miyazaki in view of Takeda et al. are discussed above.

Miyazaki in view of Takeda et al. fails to specifically teach a pipe shower in the transfer module.

Referring to the abstract, Iwai et al. teaches that it is known to provide a transfer module

Art Unit: 1763

13 with a pipe shower 71. By using a pipe shower 71, the transfer module is prevented from reaching high temperatures and films are inhibited from forming on the wafer inside the transfer module. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a pipe shower as taught by Iwai to the apparatus of Miyazaki modified by Takeda et al. This would prevent the transfer module from reaching high temperatures and inhibit films from forming on the wafer inside the transfer module.

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyazaki (Japanese Patent Publication 09-106978) in view of Takeda et al. (Japanese Patent Publication 10-189532) as applied to claims 1, 3-9, and 12-14 above, and further in view of Toshima (U.S. 6,007,675).

The teachings of Miyazaki in view of Takeda et al. are discussed above.

Miyazaki in view of Takeda et al. fails to teach that the stripping line and the cleaning line are stacked to have a two-tier structure.

Referring to Figure 6a and column 21, lines 40-65, Toshima teaches that it is well known to move wafers from a dry-stripping module 6000 to a wet-cleaning module 7000 using a wafer elevator car 1401 of a wafer elevator 1400. This mechanism, like a robot arm or conveyor, allows the wafers to proceed to next processing module without interruption. In addition, Toshima teaches having a dry-stripping module and a wet-cleaning module stacked in a single system, which saves space and a wafer exchange step, i.e. time, normally used with linear etch/clean systems. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to stack the stripping line with the cleaning line of the apparatus of

Art Unit: 1763

Miyazaki modified by Takeda et al. as taught by Toshima. This would allow the wafers to proceed to next processing module without interruption, save time, and reduce the footprint of the equipment.

5. Claims 1, 3-9, and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeOrnellas (U.S. 5,672,239) in view of Toshima (U.S. 6,007,675).

Referring to Figures 1 and 2, and column 3, lines 7-31, DeOrnellas discloses an integrated processing apparatus comprising two etch modules 20 and 22 (etching line), strip module 24 (stripping line) and rinse module 25 (cleaning line) on the stripping line. Load lock chamber 16 (loader) holds the wafers before processing and atmospheric cassette module 34 (unloader) holds the wafers after processing. Furthermore, the atmospheric cassette module 34 contains a robotic wafer handling system 32 (robot) for transferring wafers from a rinsing (cleaning) module 25 to an atmospheric cassette module 34. The vacuum chamber 26 (transfer module) connected to the load lock chamber 16 uses a robotic wafer handling system 38 (robot) for transferring the wafers to the various modules (etching and stripping). Overall, DeOrnellas discloses a closed, unified, and integrated system which performs multiple processing functions (etching, cleaning, and stripping) (col. 2, lines 26-30).

After the wafer is etched, a pre-strip rinse step and spin-dry step takes place in the rinse module 25. This prevents corrosion and the oxidizing of residues into insoluble oxides during photoresist stripping. Likewise after the stripping process, the wafer undergoes a final rinse and dry step (col. 4, lines 5-16).

DeOrnellas fails to teach an elevator for conveying the substrate from the stripping line to

Art Unit: 1763

the cleaning line, a pipe shower, and a stripping and etching line stacked in a two-tier structure .

Referring to Figure 6a and column 21, lines 40-65, Toshima teaches that it is well known to move wafers from a dry-stripping module 6000 to a wet-cleaning module 7000 using a wafer elevator car 1401 of a wafer elevator 1400. This mechanism, like a robot arm or conveyor, allows the wafers to proceed to next processing module without interruption. In addition, Toshima teaches having a dry-stripping module and a wet-cleaning module stacked in a single system, which saves space and a wafer exchange step, i.e. time, normally used with linear etch/clean systems. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of DeOrnellas with an elevator and a stacked stripping/cleaning system as taught by Toshima. This would allow the wafers to proceed to next processing module without interruption, save time, and reduce the footprint of the equipment.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeOrnellas (U.S. 5,672,239) in view of Toshima (U.S. 6,007,675) as applied to claims 1, 3-9, and 12-16 above, and further in view of Iwai et al. (Japanese Patent Publication 06-224145).

The teachings of DeOrnellas in view of Toshima have been discussed above.

DeOrnellas in view of Toshima fail to teach a pipe shower

Referring to the abstract, Iwai teaches that it is known to provide a transfer module 13 with a pipe shower 71. By using a pipe shower 71, the transfer module is prevented from reaching high temperatures and films are inhibited from forming on the wafer inside the transfer module. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a pipe shower to the apparatus of DeOrnellas in view of Toshima. This

Art Unit: 1763

would prevent the transfer module from reaching high temperatures and inhibit films from forming on the wafer inside the transfer module.

Response to Arguments

7. Applicant's arguments filed August 5, 2003 have been fully considered but they are not persuasive.

Applicant has argued that the etching and stripping chambers of Miyazaki are not unified.

However, as seen in Drawing 1, each chamber is connected to the subsequent chamber to create a unified system.

Applicant has argued that no rinsing operation occurs between the etching and stripping operation.

However, Miyazaki in view of Takeda et al. teaches a rinsing operation occurring between the etching and stripping operation.

Applicant has argued that the wafers are exposed to the atmosphere immediately after the ashing process is completed.

Paragraph [0018] states that the storage room 6 is exposed to an ambient condition and the atmosphere meaning the storage room is exposed to atmospheric pressure not opened to the atmosphere. The "atmosphere" in an English machine translation refers to atmospheric pressure. Furthermore, the claim requires no exposure to the outside between the etch and the rinse module.

Art Unit: 1763

Applicant has argued that the applied prior art apparatus is not a flow-through operation.

However, it is apparent by the arrows in Drawing 1 that the substrate flows through the system starting from the loader 2 until it reaches the unloader 13. Furthermore, a flow-through operation has not been claimed.

Applicant has argued that DeOrnellas is not a closed system.

Referring to column 2, lines 1-9, DeOrnellas describes a single system which allows etching, rinsing, stripping, and cleaning to occur. As seen in Drawing 1 and column 3, lines 8-12, the modules are connected to vacuum chamber 26 in a closed environment.

Applicant has argued that DeOrnellas cannot be referred to as "lines" in a traditional process sense.

However, applicant's invention does display a traditional process line since there are curves and an elevator. Furthermore, applicant's etching (etching module and rinsing module), stripping, and cleaning lines are considered simply modules, chambers, or vessels since the claims do not recite an in-line system.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 1763

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (703) 305-1956. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

AMC *amc*

Liz Alejandro Mulero
LIZ ALEJANDRO-MULERO
PRIMARY EXAMINER